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Communications system test successful

by Fran Crumb, Information Directorate

ROME, N.Y. — Amidst the treeless, brush and boulder-strewn terrain of the Air Force's Mountain Home Air Force Base Test Range, the military's next-generation tactical communications relay system successfully completed its first operational test in June.

An advanced development model of the software-defined Airborne Communications Relay (ACR) was demonstrated during normal Air Expeditionary Force operational training for the first time. ACR is a joint program between the Air Force Research Laboratory and the Command and Control (C2) Battlelab at Hurlburt Field, Fla.

Information Directorate personnel, acting as technical advisors to the C2 Battlelab, participated in the demonstration of the system built by Raytheon Systems Company, Fort Wayne, Ind., under a $3 million dollar effort awarded in May, 1999.

The ACR system, operating onboard a KC-135 tanker, allowed Air Force Tactical Air Control Party (TACP) units from Fort Lewis, Wash., to extend the line-of-sight of their Very High Frequency and Ultra High Frequency (VHF/UHF) radios. They were also able to establish communications with Arizona Air National Guard F-16 aircraft performing Close Air Support missions at much greater distances than normal. This allowed more time to provide precise targeting information to the pilots, thus improving bombs on target accuracy and reducing the chances of fratricide.

"The Airborne Communications Relay can serve as the key component for extending the line of sight of voice communications," said Capt. John MacPherson, program manager in the directorate's Information Grid division. "This technology may be a key enabler allowing the Air Force to retire the Airborne Battlefield Command and Control Center aircraft, saving approximately $10 million dollars a year."

"At Mountain Home, we were able to show that we could use software programmable digital radio technology to communicate between ground units and aircraft over ranges and around terrain that are beyond today's capabilities" said MacPherson. "Both pilots and TACP personnel were impressed with the capabilities of an airborne relay and its potential for enhancing the way current operations are performed."

The ACR airborne unit used at Mountain Home had eight programmable radio channels that were bridged to allow four simultaneous two-way conversations. This bridging capability also provided the ability for communications to take place between two dissimilar radio waveforms. With bridging, transmissions come in one channel, in a certain band and mode, and go out the second channel in any other band or mode that the radio software provides. This bridging capability allowed tactical air controllers to do such things as using their portable VHF-FM radios to directly communicate with F-16 pilots using radios in the UHF-AM frequency band.

"The technical challenges on the ACR program included the integration of the software radio and the development of the co-site interference system," said Mark Burke, an Information Directorate communications engineer. "This program required the design of a state-of-the-art interference mitigation system to prevent our signals from interfering with each other and those of the KC-135 cockpit radios."

Another key feature of the ACR is the means by which the system is controlled. A separate secure, UHF link from the ground is used to control and monitor the airborne system. This allows the system to be placed on other airborne platforms such as unmanned aerial vehicles, thus reducing the number of personnel that must be airborne in hostile situations.

"The next phase of the program will involve the addition of an internet-like data capability for warfighters to pass information to each other as well as connect to higher headquarters," MacPherson said. "This will provide a much-needed capability without placing additional personnel or aircraft in the line of fire." **@**